

What is claimed is:

1. An imaging lens device comprising:
a zoom lens system which comprises a plurality of lens units and changes gaps between the lens units to thereby generate an optical image of an object which can be optically and successively zoomed in and out; and
an imaging sensor which converts an optical image generated by the zoom lens system into an electric signal,
wherein the zoom lens system comprises, from the object side:
a first unit having a negative power,
a second unit having a positive power, the second unit having a cemented lens element joining three lens elements, and a lens element having a positive power,
a third unit having a positive power, and
an aperture stop disposed between the first unit and the second unit,
wherein among the three lens elements which form the cemented lens element, a lens element disposed on the object side directs a convex surface toward the object side while a lens elements disposed on the image side directs a concave surface toward the image side, and

wherein the following condition expressions are satisfied:

$$-0.2 < (R21 - R24) / (R21 + R24) < 1.0$$

$$0.6 < R21 / Fw < 10.0$$

$$0.0 \leq h2 / ha4 < 1.0$$

where

R21 : a paraxial radius of curvature of the object side-lens surface of the cemented lens element,

R24 : a paraxial radius of curvature of the image surface side-lens surface of the cemented lens element,

Fw : a focal length of the overall system at the wide-angle end,

ha4 : a distance from an optical axis of an intersection of a principal ray which is at 0.8X of a maximum half-angle of view ω at the wide-angle end and the image surface side-lens surface of the cemented lens element,

h2 : a distance from an optical axis of an intersection of a principal ray which is at 0.8X of a maximum half-angle of view ω at the wide-angle end and the outermost lens surface of the second unit toward the object side, and

where a principal ray is a ray which propagates on the center of the aperture stop.

2. An imaging lens device as claimed in claim 1, wherein the following condition is fulfilled:

$$-0.7 < f_b / f_a < 1.2$$

where

f_a : a focal length of the cemented lens element, and

f_b : a focal length of the lens element which has a positive power.

3. An imaging lens device as claimed in claim 1, wherein a most object side surface of the second unit is an aspheric surface.

4. An imaging lens device as claimed in claim 1, wherein a most image side surface of the second unit is an aspheric surface.

5. An imaging lens device as claimed in claim 1, wherein the first unit has a doublet structure comprising a negative meniscus lens which has an aspheric surface and is convex toward the object side and a positive meniscus lens which is convex toward the object side.

6. An imaging lens device as claimed in claim 1, wherein the first unit may have a structure that two negative lens elements and one positive lens element.

7. An imaging lens device as claimed in claim 1, wherein the aperture stop is disposed at the object side of the second unit and moved as one unit together with the second unit.

8. An imaging lens device as claimed in claim 1, wherein the lens element of the second unit is a single lens whose both surfaces are convex surfaces.

9. An imaging lens device as claimed in claim 1, wherein the first unit comprises the prism which has a reflection surface so as to bend an optical axis of an object ray by about 90 degrees.

10. An digital camera comprising:
an imging lens device having a zoom lens system and an imaging sensor,
the zoom lens system which comprises a plurality of lens units and changes
gaps between the lens units to thereby generate an optical image of an object which can
be optically and successively zoomed in and out; and
the imaging sensor which converts an optical image generated by the zoom

lens system into an electric signal,

wherein the zoom lens system comprises, from the object side:

a first unit having a negative power,

a second unit having a positive power, the second unit having a cemented lens element joining three lens elements, and a lens element having a positive power,

a third unit having a positive power, and

an aperture stop disposed between the first unit and the second unit,

wherein among the three lens elements which form the cemented lens element, a lens element disposed on the object side directs a convex surface toward the object side while a lens elements disposed on the image side directs a concave surface toward the image side, and

wherein the following condition expressions are satisfied:

$$-0.2 < (R21 - R24) / (R21 + R24) < 1.0$$

$$0.6 < R21 / Fw < 10.0$$

$$0.0 \leq h2 / ha4 < 1.0$$

where

R21 : a paraxial radius of curvature of the object side-lens surface of the cemented lens element,

R24 : a paraxial radius of curvature of the image surface side-lens surface of the cemented lens element,

Fw : a focal length of the overall system at the wide-angle end,

ha4 : a distance from an optical axis of an intersection of a principal ray which is at 0.8X of a maximum half-angle of view ω at the wide-angle end and the image surface side-lens surface of the cemented lens element,

h2 : a distance from an optical axis of an intersection of a principal ray which is

at 0.8X of a maximum half-angle of view ω at the wide-angle end and the outermost lens surface of the second unit toward the object side, and

where a principal ray is a ray which propagates on the center of the aperture stop.

11. A cellular telephone comprising:

an imaging lens device having a zoom lens system and an imaging sensor,
the zoom lens system which comprises a plurality of lens units and changes gaps between the lens units to thereby generate an optical image of an object which can be optically and successively zoomed in and out; and

the imaging sensor which converts an optical image generated by the zoom lens system into an electric signal,

wherein the zoom lens system comprises, from the object side:

a first unit having a negative power,

a second unit having a positive power, the second unit having a cemented lens element joining three lens elements, and a lens element having a positive power,

a third unit having a positive power, and

an aperture stop disposed between the first unit and the second unit,

wherein among the three lens elements which form the cemented lens element, a lens element disposed on the object side directs a convex surface toward the object side while a lens elements disposed on the image side directs a concave surface toward the image side, and

wherein the following condition expressions are satisfied:

$$-0.2 < (R21 - R24) / (R21 + R24) < 1.0$$

$$0.6 < R21 / Fw < 10.0$$

$$0.0 \leq h2 / ha4 < 1.0$$

where

R21 : a paraxial radius of curvature of the object side-lens surface of the cemented lens element,

R24 : a paraxial radius of curvature of the image surface side-lens surface of the cemented lens element,

Fw : a focal length of the overall system at the wide-angle end,

ha4 : a distance from an optical axis of an intersection of a principal ray which is at 0.8X of a maximum half-angle of view ω at the wide-angle end and the image surface side-lens surface of the cemented lens element,

h2 : a distance from an optical axis of an intersection of a principal ray which is at 0.8X of a maximum half-angle of view ω at the wide-angle end and the outermost lens surface of the second unit toward the object side, and

where a principal ray is a ray which propagates on the center of the aperture stop.